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EXAMINER
KAO, CHIH CHENG G

ART UNIT	PAPER NUMBER
2882	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/788,621	KOUTA ET AL.	
	Examiner	Art Unit	
	Chih-Cheng Glen Kao	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-25 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-25 is/are rejected.

7)☒ Claim(s) 12,15-17,21 and 23-25 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 21 February 2001 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6,7 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description:

Fig. 3, #21, 22, and 24, Fig. 6, #2, Fig. 8, #28, Fig. 9, #19, Fig. 14, #55, and Fig. 18, #58

A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: Page 41, line 14, band-gap 23, which may be obviated by replacing "23" with - -32- - and Page 46, line 4, refractive index 43, which may be obviated by deleting "43". The objection to the drawings will not be held in abeyance.

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the liquid or gelled material applied to the surface along with all the other limitations in claim 12, a planar slub wave-guide of claim 15, and a convex surface shape of claim 25 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

4. Claims 12, 15-17, 21, and 23-25 are objected to because of lack of antecedent problems or other minor drafting errors. The following limitations are recited: (claim 12, line 4, "substantial same"), (claim 15, lines 2-3, "the glass"), (claim 16, line 2, "at least one of the"), (claim 17, line 3, "the multiplexed rays"), (claim 17, line 5, "the ray"), (claim 21, line 2, "the clad section"), (claim 23, line 4, "the core sections"), (claim 24, line 2, "the rays"), and (claim 25, line 4, "the laser wave-guide").

The following respective corrections are suggested: (claim 12, line 4, replacing "substantial" with - -substantially the- -), (claim 15, lines 2-3, deleting "glass"), (claim 16, line 2, deleting "of the"), (claim 17, line 3, deleting "the"), (claim 17, line 5, replacing "the" with - -a- -), (claim 21, line 2, replacing "the" with - -a- -), (claim 23, line 4, deleting "the"), (claim 24, line 2, deleting "the"), and (claim 25, line 4, replacing "laser" with - -optical- -).

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-6, 10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. (Optics Letters) in view of Dianov et al. (US patent 5838700).

6. With regards to claim 1, Kondo et al. discloses a method of modifying a refractive index having a core and clad section (Fig. 1) including irradiating laser rays with a pulse width not more than 30 pico-seconds to at least one of the core and clad section (Page 646, col. 2, lines 1-5 and Fig. 1).

However, Kondo et al. does not disclose modifying a waveguide.

Dianov et al. teaches modifying a waveguide (Title and Abstract, lines 1-5).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to modify a waveguide of Dianov et al. with the method of Kondo et al., since waveguides and fibers are considered art-recognized equivalents as implied from Dianov et al. (Abstract, lines 1-5). It would have been within routine skill in the art to substitute one for the other. One would be motivated to modify waveguides to make gratings as implied from Dianov et al. (Abstract, lines 1-10).

7. With regards to claim 2, Kondo et al. further discloses laser rays having photon energy lower than half of band-gap energy of a material of the clad section inherently (Page 646, col. 1, last paragraph, "clad glasses were Ge-doped and pure-silica glass", and col. 2, lines 1-5, "800 nm").

8. With regards to claim 3, Kondo et al. further discloses irradiating the core to change only the refractive index of only the core and not the cladding (Page 647, col. 1, lines 25-35).

9. With regards to claim 4, Kondo et al. further discloses irradiating the core and periphery to change only the refractive index of the core and periphery (Page 647, col. 1, lines 25-35).

10. With regards to claim 5, Kondo et al. further discloses scanning along the core at least one time (Fig. 1, "Scanning").

11. With regards to claim 6, Kondo et al. in view of Dianov et al. suggests a method as recited above. Kondo et al. further discloses a core section of three dimensional-structure (Fig. 1).

However, Kondo et al. does not specifically disclose rays irradiated to the bottom part of the core to modify the refractive index without changing the top part of the core.

Kondo et al. further discloses rays irradiated to the right part of the core to modify the refractive index without changing the left part of the core.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to modify parts of a core of Kondo et al. such as a bottom part with the suggested method of Kondo et al. in view of Dianov et al., since rearranging parts of an invention involves only routine skill in the art. One would be motivated to modify only the bottom part of the core to change the grating at one particular area in order to create a grating as implied from Kondo et al. (Fig. 1).

12. With regards to claim 10, Kondo et al. further discloses rays having a power density (inherent) of saturating the change of the refractive index of the core section (Page 646, col. 1, second paragraph).

13. With regards to claim 11, Kondo et al. further discloses irradiating for heating (inherent) as well as modifying the refractive index of the core, thereby unnecessitating thermal treatment (Abstract).

14. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Dianov et al. as applied to claim 1 above, and further in view of Kashyap (US Patent 6104852).

Kondo et al. in view of Dianov et al. suggests a method as recited above.

However, Kondo et al. does not disclose increasing a density to elevated the refractive index.

Kashyap teaches increasing a density to elevated the refractive index (col. 5, lines 25-35).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to increase a density of Kashyap with the suggested method of Kondo et al. in view of Dianov et al., since one would be motivated to increase the photosensitivity of the fiber when writing a grating as implied from Kashyap (col. 5, lines 22-35).

15. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Dianov et al. as applied to claim 1 above, and further in view of Kircher (US Patent 4537469).

Kondo et al. in view of Dianov et al. suggests a method as recited above.

However, Kondo et al. does not disclose refractive index reduced by decreasing a density.

Kircher teaches refractive index reduced by decreasing a density (col. 3, lines 30-40).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to reduce refractive index by decreasing a density of Kircher with the suggested method of Kondo et al. in view of Dianov et al., since one would be motivated to do this to insure proper light transmission in an optical fiber as implied from Kircher (col. 3, lines 30-40).

16. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Dianov et al. as applied to claim 1 above, and further in view of Reekie et al. (US Patent 6240224)

Kondo et al. in view of Dianov et al. suggests a method as recited above.

However, Kondo et al. does not disclose thermally treating after modification.

Reekie et al. teaches thermally treating after modification (col. 2, lines 39-43).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to thermally treat of Reekie et al. with the suggested method of Kondo et al. in view of Dianov et al., since one would be motivated to do this to stabilize the long-term properties of the index grating as implied from Reekie et al. (col. 2, lines 39-43).

17. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Dianov et al. as applied to claim 1 above, and further in view of Adar et al. (US Patent 5305336) and Froning et al. (US Patent 5177859)

Kondo et al. in view of Dianov et al. suggests a method as recited above.

However, Kondo et al. does not disclose wherein when a surface of the waveguide is uneven, the laser rays are irradiated after liquid or gelled material having a refractive index substantially the same as that of the clad section is applied to the surface, and a transparent material through which the laser rays permeate is applied thereon to flatten the surface.

Froning et al. teaches wherein when a surface of the waveguide is uneven (Fig. 6), the laser rays are irradiated after liquid or gelled material (Fig 6, #22) having a refractive index substantially the same as that of the clad section is applied to the surface (col. 2, lines 46-55), and a transparent material through which the laser rays permeate is applied thereon to flatten the surface (Fig. 6, #20 and claim 4). Adar et al. further teaches laser rays permeating (col. 1, lines 20-25).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have even the surface of the waveguide of Froning et al. with the suggested method of Kondo et al. in view of Dianov et al., since one would be motivated to do this to prevent scattering of the signal as implied by Froning et al. (col. 1, lines 19-25), which can cause signal loss.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the permeating lasers of Adar et al. with the suggested method of

Kondo et al. in view of Dianov et al., since one would be motivated to have these lasers for a specific function such as long distance optical fiber communication (col. 1, lines 15-25).

18. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Dianov et al. as applied to claim 1 above, and further in view of Kershaw (US Patent 6154591).

Kondo et al. in view of Dianov et al. suggests a method as recited above.

However, Kondo et al. does not disclose the shape of the core changed to have a taper.

Kershaw teaches the shape of the core changed to have a taper (col. 2, lines 57-63).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have a tapered core of Kershaw with the suggested method of Kondo et al. in view of Dianov et al., since one would be motivated to do this to reduce cavity losses as implied from Kershaw (col. 2, lines 57-63).

19. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Dianov et al. as applied to claim 1 above, and further in view of Koops et al. (US Patent 5982962).

Kondo et al. in view of Dianov et al. suggests a method as recited above.

However, Kondo et al. does not disclose a grating for diffracting rays in the core to any direction.

Koops et al. teaches a grating for diffracting rays in the core to any direction (Fig. 10).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have a diffraction grating of Koops et al. with the suggested method of Kondo et al. in view of Dianov et al., since one would be motivated to use it for coupling light between one fiber and a plurality of fibers as implied from Koops et al. (col. 1, lines 25-30).

20. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Dianov et al. as applied to claim 1 above, and further in view of Yamada et al. (JP 07-294756).

21. With regards to claim 15, Kondo et al. in view of Dianov et al. suggests a method as recited above.

However, Kondo et al. does not disclose the core doped with GeO_2 nor a slub included.

Dianov et al. further teaches the core doped with GeO_2 (col. 1, lines 10-15). Yamada et al. further teaches a slub included (Fig. 8, #14).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have GeO_2 of Dianov et al. with the suggested method of Kondo et al. in view of Dianov et al., since it would have been within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use of obvious design choice. One would be motivated to use GeO_2 to vary the optical properties of the waveguide based on its doping concentration as implied from Dianov et al. (col. 4, lines 22-26).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have slub of Yamada et al. with the suggested method of Kondo et al. in

view of Dianov et al., since one would be motivated to use them for multiplexing (Drawings 5 and 8) and processing many signals as implied from Yamada et al.

22. With regards to claim 16, Kondo et al. in view of Dianov et al. suggests a method as recited above. Kondo et al. further discloses the wave-guide subjected to modification (Abstract).

However, Kondo et al. does not disclose a coupler.

Yamada et al. further teaches a coupler (Fig. 6A, #6).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have a coupler of Yamada et al. with the suggested method of Kondo et al. in view of Dianov et al., since one would be motivated to use them for multiplexing (Drawings 5 and 8) and processing many signals as implied from Yamada et al.

23. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Dianov et al. as applied to claim 1 above, and further in view of Yamada et al. and Yamauchi et al. (US Patent 6459829).

Kondo et al. in view of Dianov et al. suggests a method as recited above.

However, Kondo et al. does not disclose an array grating for WDM telecommunications binding the divided rays and modifying the refractive index such that a ray having a specified wavelength is coupled to the waveguide.

Yamada et al. further teaches an array grating for WDM telecommunications (Fig. 5) binding the divided rays (Fig. 5, #13 and 14), and modifying the refractive index such that a ray

having a specified wavelength is coupled to the waveguide (Fig. 8). Yamauchi et al. teaches modifying the refractive index such that a ray having a specified wavelength is coupled to the waveguide (col. 11, lines 35-42).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the array grating for WDM communications with binding of Yamada et al. with the suggested method of Kondo et al. in view of Dianov et al., since one would be motivated to use them for multiplexing (Fig. 5) and processing many signals as implied from Yamada et al.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the modified refractive index modified by a specific wavelength coupled to the waveguide of Yamauchi et al. with the suggested method of Kondo et al. in view of Dianov et al., since one would be motivated to use a specific wavelength to produce a considerable increase in the refractive index as implied from Yamauchi et al. (col. 11, lines 35-42).

24. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Dianov et al. as applied to claim 1 above, and further in view of Koops et al., Kristensen et al. (US Patent 6151429), and Bhagavatula (US Patent 6046854).

Kondo et al. in view of Dianov et al. suggests a method as recited above.

However, Kondo et al. does not disclose a fiber grating for diffracting a ray with a specified wavelength and the refractive index modified by the specified wavelength for feedbacking.

Koops further teaches a fiber grating for diffracting a ray with a specified wavelength (Fig. 10). Kristensen et al. further teaches modifying the refractive index by the specified wavelength (col. 17, lines 8-15). Bhagavatula further teaches feedbacking (col. 8, lines 43-56).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have a diffraction grating of Koops et al. with the suggested method of Kondo et al. in view of Dianov et al., since one would be motivated to use it for coupling light between one fiber and a plurality of fibers as implied from Koops et al. (col. 1, lines 25-30).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to modify the refractive index by a specified wavelength of Kristensen et al. with the suggested method of Kondo et al. in view of Dianov et al., since one would be motivated to do this to ensure proper signal output as implied from Kristensen et al. (col. 17, lines 8-15).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the feedback of Bhagavatula with the suggested method of Kondo et al. in view of Dianov et al., since one would be motivated to have feedback to obtain the desired optical characteristics of the target as implied from Bhagavatula (col. 8, lines 43-56).

25. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Dianov et al. and Kewitsch et al. (US Patent 6169830).

Kondo et al. discloses an apparatus for modifying a refractive index of an optical wave-guide device (Fig. 1) including a stage for holding and moving the device in x, y, and z

directions (Fig. 1, "XYZ-stage"), a lasing section for emitting rays having a pulse width not more than 30 pico-seconds (Fig. 1, "Laser"), and an optical system section for irradiating the rays on the core section of the device (Fig. 1, "Scanning").

However, Kondo et al. does not disclose a chamber and a waveguide.

Dianov et al. teaches modifying a waveguide (Title and Abstract, lines 1-5). Kewitsch et al. teaches a chamber (Fig. 13, #130).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to modify a waveguide of Dianov et al. with the method of Kondo et al., since waveguides and fibers are considered art-recognized equivalents as implied from Dianov et al. (Abstract, lines 1-5). It would have been within routine skill in the art to substitute one for the other. One would be motivated to modify waveguides to make gratings as implied from Dianov et al. (Abstract, lines 1-10).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the chamber of Kewitsch et al. with the device of Kondo et al., since one would be motivated to have the chamber to induce pressure and add dopants to the glass to better photosensitize the glass as implied from Kewitsch et al. (col. 16, lines 30-40).

26. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Dianov et al. and Kewitsch et al. as applied to claim 19 above, and further in view of Kristensen et al. and Bhagavatula.

Kondo et al. in view of Dianov et al. and Kewitsch et al. suggests an apparatus as recited above. Kondo et al. further discloses a function of irradiating rays to the core section while the

rays are guided after the wave-guide device is bonded to an input and output surface (Fig. 1 and Page 647, lines 25-35).

However, Kondo et al. does not disclose feedbacking outputs from the device to irradiation conditions of the laser for obtaining the change in the refractive index of the target.

Kristensen et al. further teaches feedbacking outputs (col. 17, lines 8-15). Bhagavatula teaches feedbacking to irradiation conditions of the laser for obtaining the change in the refractive index of the target (col. 8, lines 43-56).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to feedback outputs of Kristensen et al. with the suggested device of Kondo et al. in view of Dianov et al. and Kewitsch et al., since one would be motivated to do this to ensure proper signal output as implied from Kristensen et al. (col. 17, lines 8-15).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the feedback of Bhagavatula with the suggested device of Kondo et al. in view of Dianov et al. and Kewitsch et al., since one would be motivated to have feedback to obtain the desired optical characteristics of the target as implied from Bhagavatula (col. 8, lines 43-56).

27. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Dianov et al. and Kewitsch et al. as applied to claim 19 above, and further in view of Ooba et al. (US Patent 6084050).

Kondo et al. in view of Dianov et al. and Kewitsch et al. suggests an apparatus as recited above. Kondo et al. further discloses the refractive index of the core section modified (Title, Figure 1, and Page 647, col. 1, second paragraph).

However, Kondo et al. does not disclose the core and clad made of amorphous or a polymer molecule.

Ooba et al. teaches the core and clad made of amorphous or a polymer molecule (col. 2, lines 25-31).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have core and clad made of a polymer molecule of Ooba et al. with the suggested device of Kondo et al. in view of Dianov et al. and Kewitsch et al., since it would have been within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use of obvious design choice. One would be motivated to use polymers for its superiority of its thermo-optic coefficient to glass as implied from Ooba et al. (col. 2, lines 25-31).

28. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Dianov et al. and Kewitsch et al. as applied to claim 19 above, and further in view of Suzuki et al. (US Patent 6031957) and Kenney et al. (US Patent 6311004).

Kondo et al. in view of Dianov et al. and Kewitsch et al. suggests an apparatus as recited above. Kondo et al. further discloses the refractive index of the core section modified (Title, Figure 1, and Page 647, col. 1, second paragraph).

However, Kondo et al. does not disclose the waveguide device formed in a glass thin film having a thickness of 100um or less overlying a silicon substrate.

Suzuki et al. teaches the waveguide device formed in a glass thin film (Abstract) having a thickness of 100um or less (col. 3, lines 44-50) overlying a substrate (Fig. 1, #1). Kenney et al. teaches a silicon substrate (col. 8, lines 33-38).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have a glass thin film waveguide of Suzuki et al. with the suggested device of Kondo et al. in view of Dianov et al. and Kewitsch et al., since it would have been within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use of obvious design choice. One would be motivated to incorporate this for its small size, amenability to integration and mass-production, and to cope with the increasing multiplicity of channels from the view point of cost and productivity as implied from Suzuki et al. (col. 1, lines 25-45).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have a silicon substrate of Kenney et al. with the suggested device of Kondo et al. in view of Dianov et al. and Kewitsch et al., since it would have been within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use of obvious design choice. One would be motivated to incorporate this for good mechanical support as implied from Kenney et al. (col. 8, lines 33-38).

29. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Dianov et al. and Kewitsch et al. as applied to claim 19 above, and further in view of Baney (US Patent 6014480) and Barbarossa et al. (US Patent 6442311).

Kondo et al. in view of Dianov et al. and Kewitsch et al. suggests an apparatus as recited above. Kondo et al. further discloses the refractive index of the core section modified (Title, Figure 1, and Page 647, col. 1, second paragraph).

However, Kondo et al. does not disclose a plurality of waveguides having an interval of 30um or less, and core sections individually modified.

Baney et al. teaches core sections individually modified (Fig. 1). Barbarossa et al. teaches a plurality of waveguides having an interval of 30um or less (col. 1, lines 50-55).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have core sections individually modified of Baney et al. with the suggested device of Kondo et al. in view of Dianov et al. and Kewitsch et al., since one would be motivated to incorporate this for better demultiplexing a wavelength division multiplexed optical signal as implied from Baney et al. (col. 1, lines 39-44).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the waveguides having an interval of 30um or less of Barbarossa et al. with the suggested device of Kondo et al. in view of Dianov et al. and Kewitsch et al., since rearranging parts of an invention involves only routine skill in the art, a mere change in size of a component is generally recognized as being within the level of ordinary skill in the art, and where the general conditions of a claim are disclose in the prior art, discovering the optimum or

workable ranges involves only routine skill in the art. One would be motivated to have such an interval in order to minimize the size of the device for reduction of material costs.

30. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Dianov et al. and Kewitsch et al. as applied to claim 19 above, and further in view of Dianov et al. (Publication).

Kondo et al. in view of Dianov et al. (Patent) and Kewitsch et al. suggests an apparatus as recited above.

However, Kondo et al. does not disclose the core with glass-based material with no GeO_2.

Dianov et al. (Publication) teaches the core with glass-based material with no GeO_2 (Publication, Page 236, first paragraph of article).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the core with glass-based material with no GeO_2 of Dianov et al. (Publication) with the suggested device of Kondo et al. in view of Dianov et al. (Patent) and Kewitsch et al., since one would be motivated to use this for being more resistant to gamma-radiation as implied from Dianov et al. (Publication, Page 236, first paragraph of article).

31. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Dianov et al. and Kewitsch et al. as applied to claim 19 above, and further in view of Hill et al. (US Patent 5216739).

Kondo et al. in view of Dianov et al. (Patent) and Kewitsch et al. suggests an apparatus as recited above.

However, Kondo et al. does not disclose a surface shape of the optical waveguide convex to act as a lens to focus rays to the core of the waveguide.

Hill et al. teaches a surface shape of the optical waveguide convex to act as a lens to focus rays to the core of the waveguide (Fig. 5A, and col. 5, lines 37-42).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to lens surface shape of Hill et al. with the suggested device of Kondo et al. in view of Dianov et al. and Kewitsch et al., since one would be motivated to use this better focus the light as implied from Hill et al. (col. 5, lines 37-42).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Cheng Glen Kao whose telephone number is (703) 605-5298. The examiner can normally be reached on M - Th (8 am to 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

gk
May 14, 2003

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